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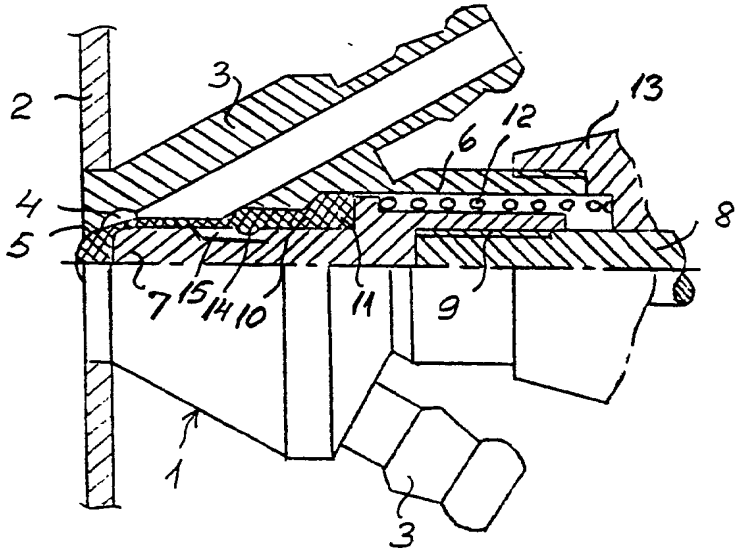
(54) Title: A SAMPLING VALVE



(57) Abstract

In a sampling valve comprising a stretchable hollow valve plug (10) mounted on the front end of an axially displaceable valve stem (7, 8), the plug is provided on its inner surface with a bead (14) projecting into a groove (15) in the stem without influencing the stretching and retraction of the plug. When the stem is withdrawn from the valve body (1) for inspection or other purposes, the plug is carried along due to the engagement of the bead (14) with a side wall of the groove.

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A Sampling valve.

This invention relates to a sampling valve of the type comprising a valve body having an axial bore, a valve stem axially displaceable in the bore, and a stretchable hollow valve plug that is mounted on the front end of the valve stem and in its stretched position closes against a valve seat coaxial with the bore and extending from an annular channel communicating with a pair of hose connection branches of the valve body.

Such a valve structure is disclosed in the published documents of Applicant's Danish Patent Application No. 2732/86. An important feature of this valve is that the valve plug is firmly bonded to the wall of the axial bore at least in its area adjacent the annular channel, for the purpose of preventing liquid from penetrating between the valve body and the plug. Such a risk is involved with a previously known sampling valve, cf. Danish Patent Specification No. 147,119, in which the plug is firmly bonded to the forward end portion of the stem and forms a plunger operating in the forward end of the bore.

In the latter case the plug may be withdrawn from the bore together with the valve stem, e.g. for renewal or for allowing the interior of the valve to be inspected, whereas in the former case such a withdrawal or removal of the plug from the bore is more complicated because its bonding to the bore wall must be broken. The plug may be thereby further damaged so that it cannot be used again.

The sampling valve of the invention differs from the known structures by the feature that on the inner surface of the valve plug member a bead is provided which in the mounted position of the member projects into a circumferential groove formed in the valve stem

and having an axial length that is sufficient to permit the stretching of the valve plug from its open to its closed position.

Under normal operating conditions the groove of the valve stem does not prevent the bead from moving axially backwards and forwards relative to the stem when the plug is stretched and allowed to retract, respectively. However, when it is desired to remove the plug for inspection or other purposes, the stem may simply be withdrawn axially out of the bore, thereby causing the plug to be carried along after the bead has come into contact with the forward side wall of the groove. When the plug has got clear of the bore, it may easily be snapped free from the stem, if so desired.

The invention will now be more fully described with reference to the drawing, in which

Fig. 1 is a side elevation and axial section of a preferred embodiment of the valve in its closed position, and

Fig. 2 a similar view of the valve when open.

In the illustrated embodiment the valve comprises a body or casing 1 adapted to be firmly mounted in the wall 2 of a tank or pipe containing a liquid from which samples shall be taken from time to time. A pair of hose connection branches 3 communicate at their inner ends with an annular channel 4 adjacent a central valve seat 5.

A bore 6 in body 1 is co-axial with the valve seat, and in this bore a valve stem is axially displaceable. The stem comprises a front or lower portion 7 and a back or upper portion 8 with a threaded connection 9 therebetween.

A stretchable hollow valve plug 10 fits into the forward end of the bore 6 and rests with a collar 11 at its open end against a shoulder in the bore. The

plug 10 surrounds the forward end of the stem portion 7 which in Fig. 1 is urged to the left by a helical compression spring 12 so that the plug 10 is stretched longitudinally and with its forward end or bottom is held in close contact against the valve seat 5. In this position a small amount of liquid may be withdrawn from the tank or pipe by means of a hypodermic needle inserted through one of the branches and forced through the closed end of the plug 10.

The upper portion 8 of the stem is associated with a manual control, not shown, which is detachably connected with the valve body by means of a union nut 13 and is operative to displace the stem 7, 8 backwards against the force of the spring 12, so that the plug 10 is allowed to contract to the open position illustrated in Fig. 2.

On the inner side of the plug 10 an annular bead 14 is provided which projects into a circumferential groove 15 in stem portion 7. The axial length of this groove is such that it offers sufficient clearance for the bead when the plug is stretched and allowed to contract as explained above.

When it is desired to inspect the interior of the valve or possibly exchange plug 10, nut 13 may be loosened and stem 7, 8 retracted from the bore 6 whereby the plug 10 is carried along due to the contact between bead 14 and the forward side wall of groove 15.

PATENT CLAIMS

1. A sampling valve comprising a valve body (1) having an axial bore (6), a valve stem (7,8) axially displaceable in the bore, and a stretchable hollow valve plug (10) that is mounted on the front end of the valve stem and in its stretched position closes against a valve seat (5) coaxial with the bore and extending from an annular channel (4) communicating with a pair of hose connection branches (3) of the valve body, characterized in that on the inner surface of the valve plug member (10) a bead (14) is provided which in the mounted position of the member projects into a circumferential groove (15) formed in the valve stem (7) and having an axial length that is sufficient to permit the stretching of the valve plug from its open to its closed position.

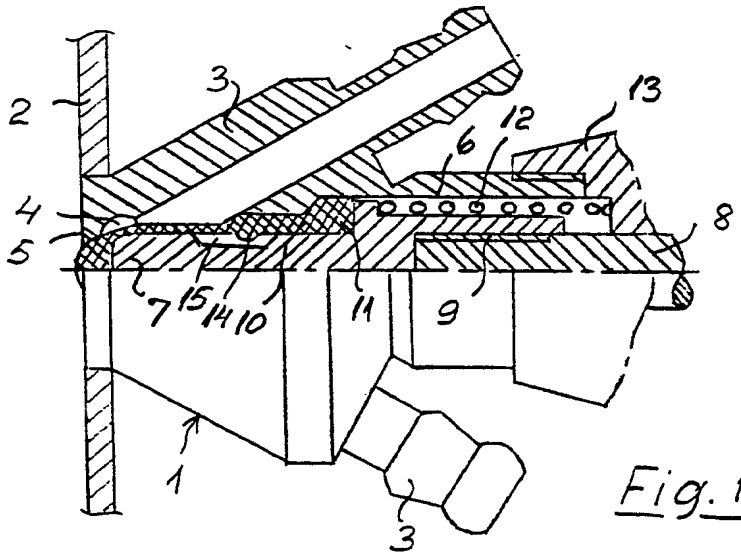

Fig. 1. V

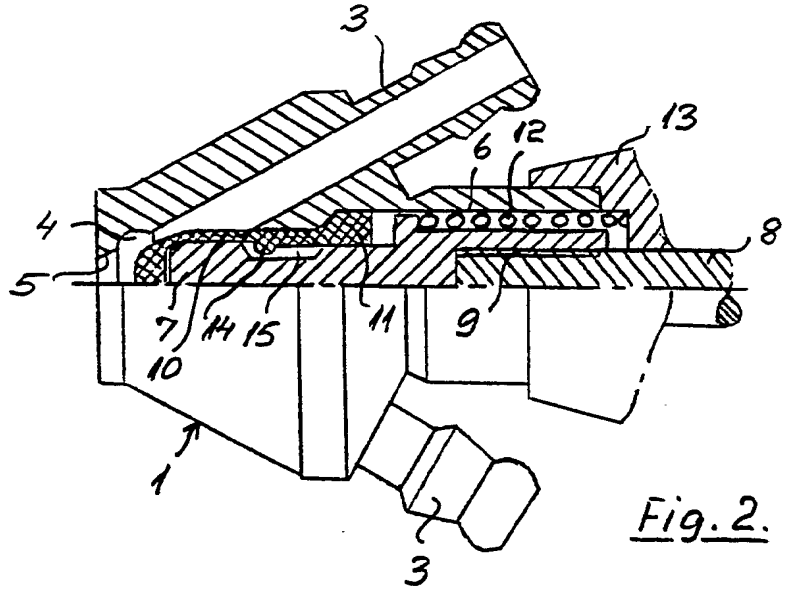

Fig. 2.

INTERNATIONAL SEARCH REPORT

International Application No PCT/DK89/00095

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

F 16 K 7/16

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC 4	F 16 K
US Cl	73: 425.4R, 863.72, 73, 85, 86; 137:67, 219, 509, 510, 843, 853, 860-863; 251:74, 84, 85, .../...

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
A	DK, B, 147 119 (OTTUNG, KAJ) 9 April 1984	1
A	SE, B, 318 753 (TOMLINSON INDUSTRIES, INC.) 15 December 1986	1
A	SE, B, 445 852 (STERIDOSE SYSTEMS AB) 21 July 1986	1
A	CH, A5, 635 407 (MILUN MITIC) 31 March 1983	1
A	US, A 4 552 336 (GIOVANNI; PASTRONE) 12 November 1985	1

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1990-02-14	1990 -02- 14
International Searching Authority	**Signature of Authorized Officer**
Swedish Patent Office	Christian Westberg

Form PCT/ISA/210 (second sheet) (January 1985)

SUBSTITUTE SHEET

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

II Fields Searched (cont)

US Cl 170, 171, 331, 333-335

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers ..... because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers ....., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers....., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [2]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.